

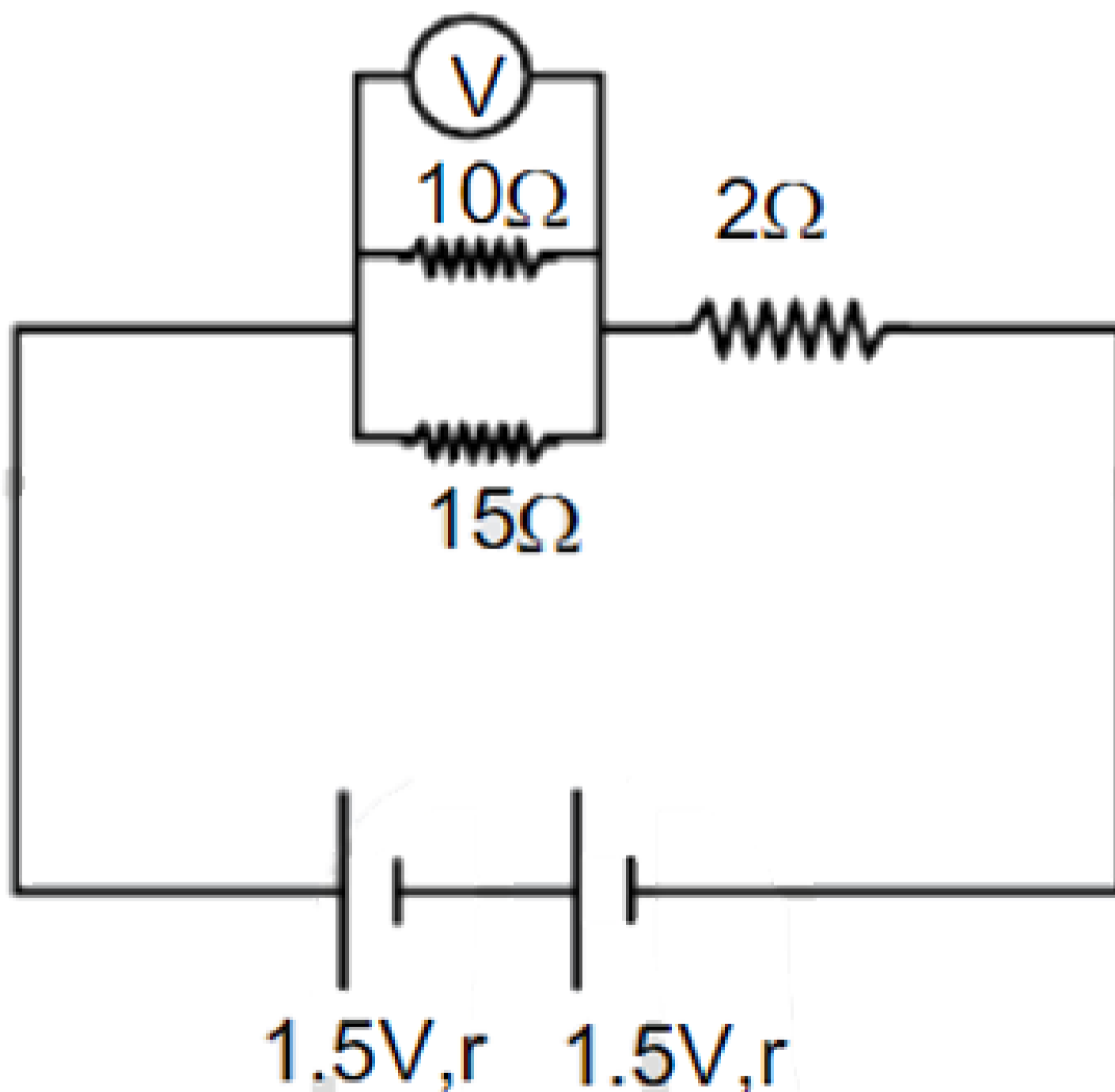
Ques No.

Question

1 - 9486440

**JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 1 -
MEMORY BASED - PHYSICS**

If the reading of the ideal voltmeter shown in the circuit is $2V$ the internal resistance of the two identical cells is



- (A) 1Ω
- (B) 0.5Ω
- (C) 1.5Ω
- (D) 2Ω

CORRECT OPTION: B

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2 - 9486442

**JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 1 -
MEMORY BASED - PHYSICS**

A stationary source of sound is emitting sound of frequency $500Hz$. Two observers A and B lying on the same line as the source, observe frequencies $480Hz$ and $530Hz$ respectively. The velocity of A and B respectively are (in m/s), speed of sound $= 300m/s$.

- (A) 12, 18

(B) 8, 18

(C) 18, 8

(D) 18, 12

CORRECT OPTION: A

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3 - 9486443

**JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 1 -
MEMORY BASED - PHYSICS**

The height above the surface of earth at which acceleration due to gravity is half the acceleration due to gravity at surface of earth is ($R = 6.4 \times 10^6 m$)

(A) $6.4 \times 10^6 m$

(B) $2.6 \times 10^6 m$

(C) $12.8 \times 10^6 m$

(D) $19.2 \times 10^6 m$

CORRECT OPTION: B

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4 - 9486444

**JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 1 -
MEMORY BASED - PHYSICS**

Equation of motion for a particle performing damped harmonic oscillation is given as $x = e^{-1t} \cos(10\pi t + \phi)$.

The time when amplitude will half of the initial is :

(A) 27

(B) 4

(C) 1

(D) 7

CORRECT OPTION: D

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MEMORY BASED - PHYSICS**

A sample containing same number of two nuclei A and B start decaying. The decay constant of A and B are 10λ .

The time after which $\frac{N_A}{N_a}$ becomes $\frac{1}{e}$ is

- (A) $\frac{1}{9\lambda}$
(B) $\frac{1}{18\lambda}$
(C) $\frac{2}{9\lambda}$
(D) $\frac{3}{19\lambda}$

CORRECT OPTION: A

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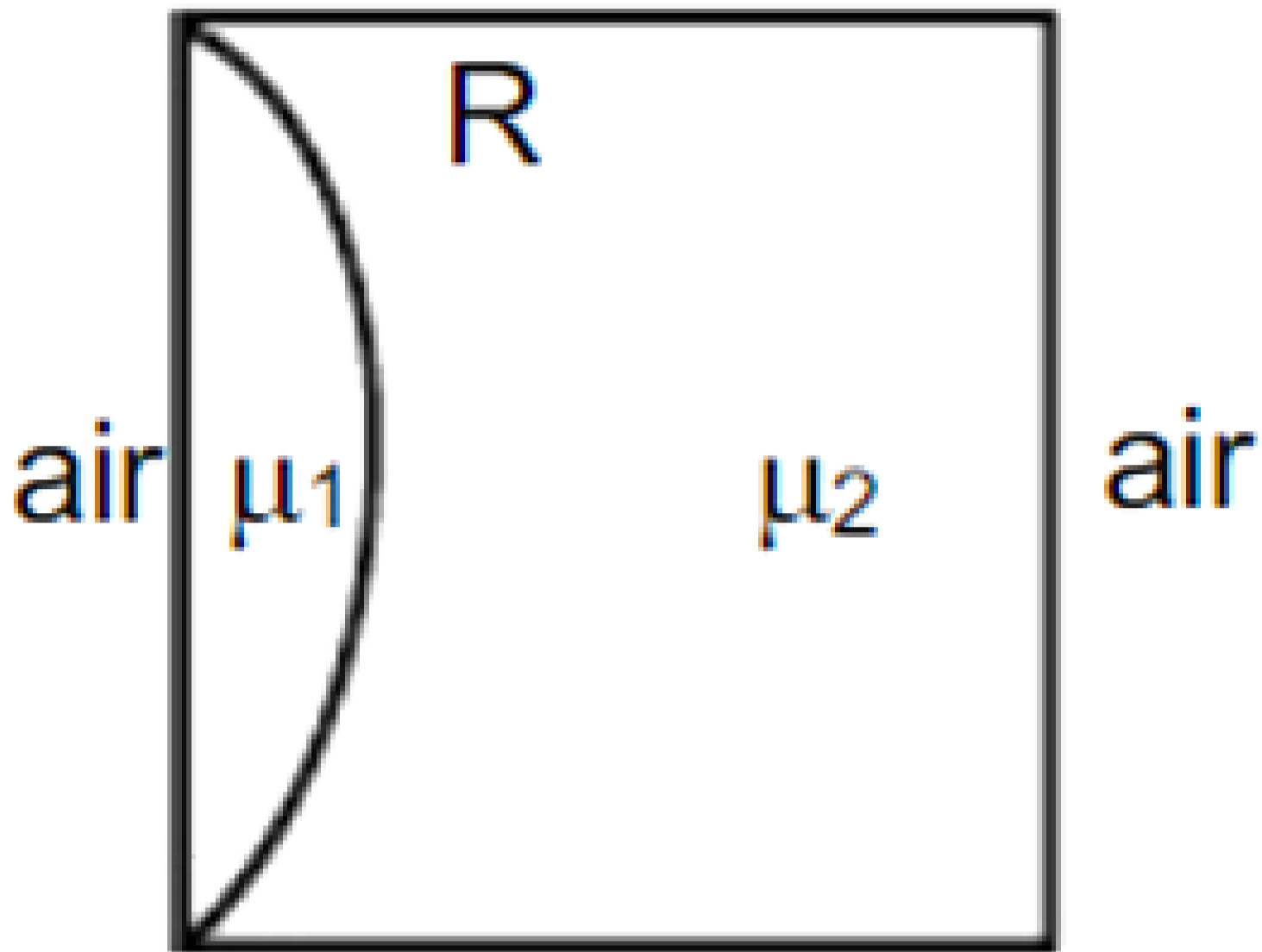
In conducting wire of radius 5mm , resistivity $\rho = 1.1 \times 10^{-8} \Omega/m$ and current of 5A is flowing. Drift velocity of free electron is $1.1 \times 10^{-3} \text{m/s}$ find out mobility of free electron.

- (A) $1.57 \text{m}^2 \text{ volt/sec.}$
- (B) $1.25 \text{m}^2 \text{ volt/sec.}$
- (C) $1.2 \text{m}^2 \text{ volt/sec.}$
- (D) $2 \text{m}^2 \text{ volt/sec.}$

CORRECT OPTION: A

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Find out equivalent focal length of given lens combination



- (A) $\left(\frac{R}{\mu_1 - \mu_2} \right)$
- (B) $\left(\frac{2R}{\mu_1 - \mu_2} \right)$
- (C) $\left(\frac{4R}{\mu_1 - \mu_2} \right)$
- (D) $\left(\frac{R}{\mu_1 + \mu_2} \right)$

CORRECT OPTION: A

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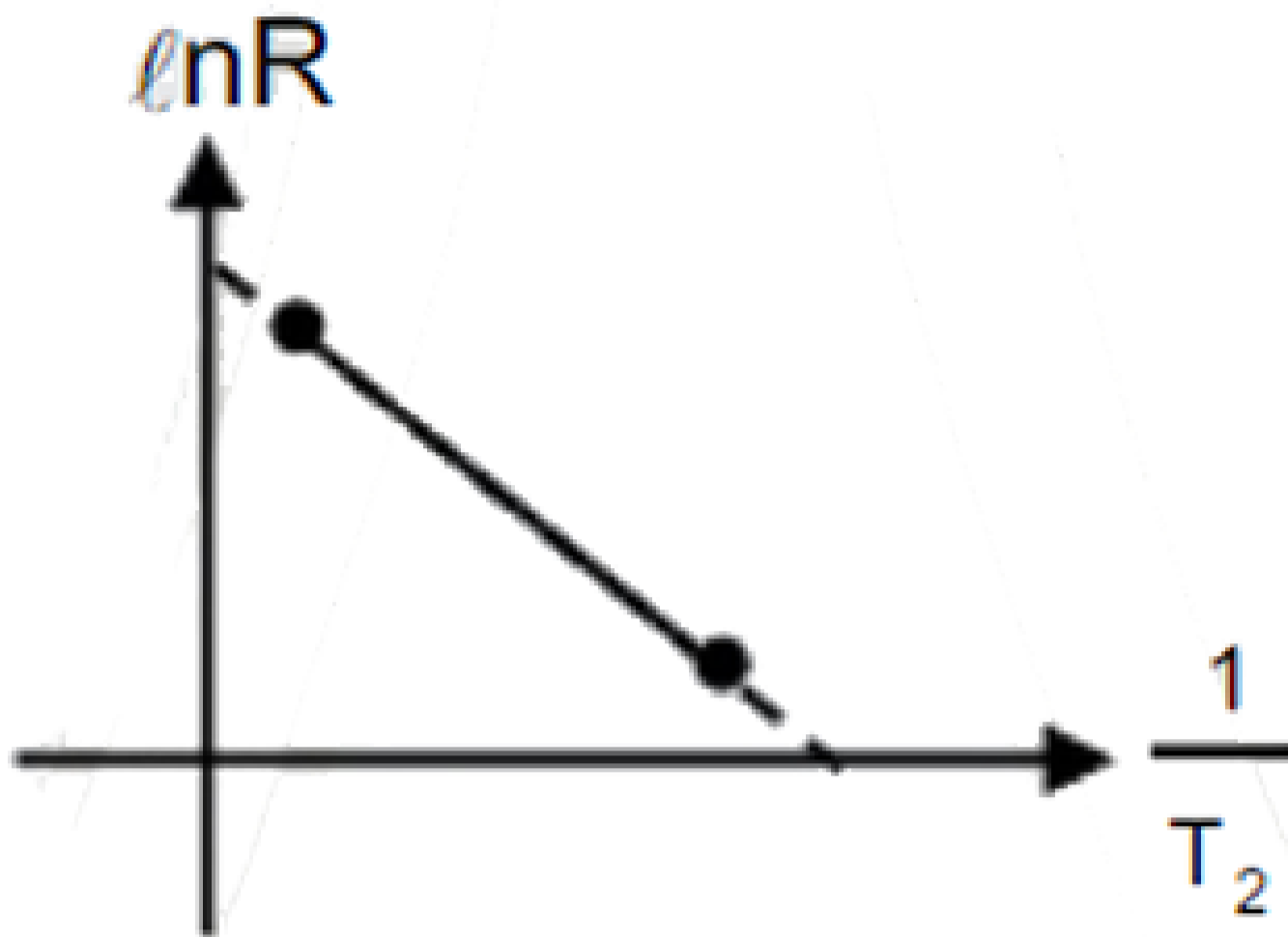
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8 - 9486449

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The graph shows the variation of $\ln Rv / s \frac{1}{T^2}$, where R is resistance and T is temperature. Then find R as function T .



- (A) $R = R_0 e^{T_0^2/T_2}$
- (B) $R = R_0 e^{-T^2/T_0^2}$
- (C) $R = R_0 e^{T^3/T_0}$
- (D) $R = R_0 e^{-T^3/T_0^3}$

CORRECT OPTION: A

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MEMORY BASED - PHYSICS

Two uniform circular rough disc of moment of inertia I_1 and $\frac{I_1}{2}$ are rotating with angular velocity ω_1 and $\frac{\omega_1}{2}$ respectively in same direction. Now one disc is placed the other disc co-axially. The change in kinetic energy of the system is :

- (A) $-\frac{1}{24}I_1\omega_1^2$
(B) $\frac{1}{24}I_1\omega_1^2$
(C) $\frac{1}{12}I_1\omega_1^2$
(D) $-\frac{1}{12}I_1\omega_1^2$

CORRECT OPTION: A

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An electron, a proton and a He^+ ion projected into a magnetic field with same kinetic energy, with velocities being perpendicular to the magnetic field. The order of the radii of circles traced by them is :

(A) $r_p > r_{He^+} > r_e$

(B) $r_{He^+} > r_p > r_e$

(C) $r_p = r_{He^+} < r_e$

(D) None

CORRECT OPTION: B

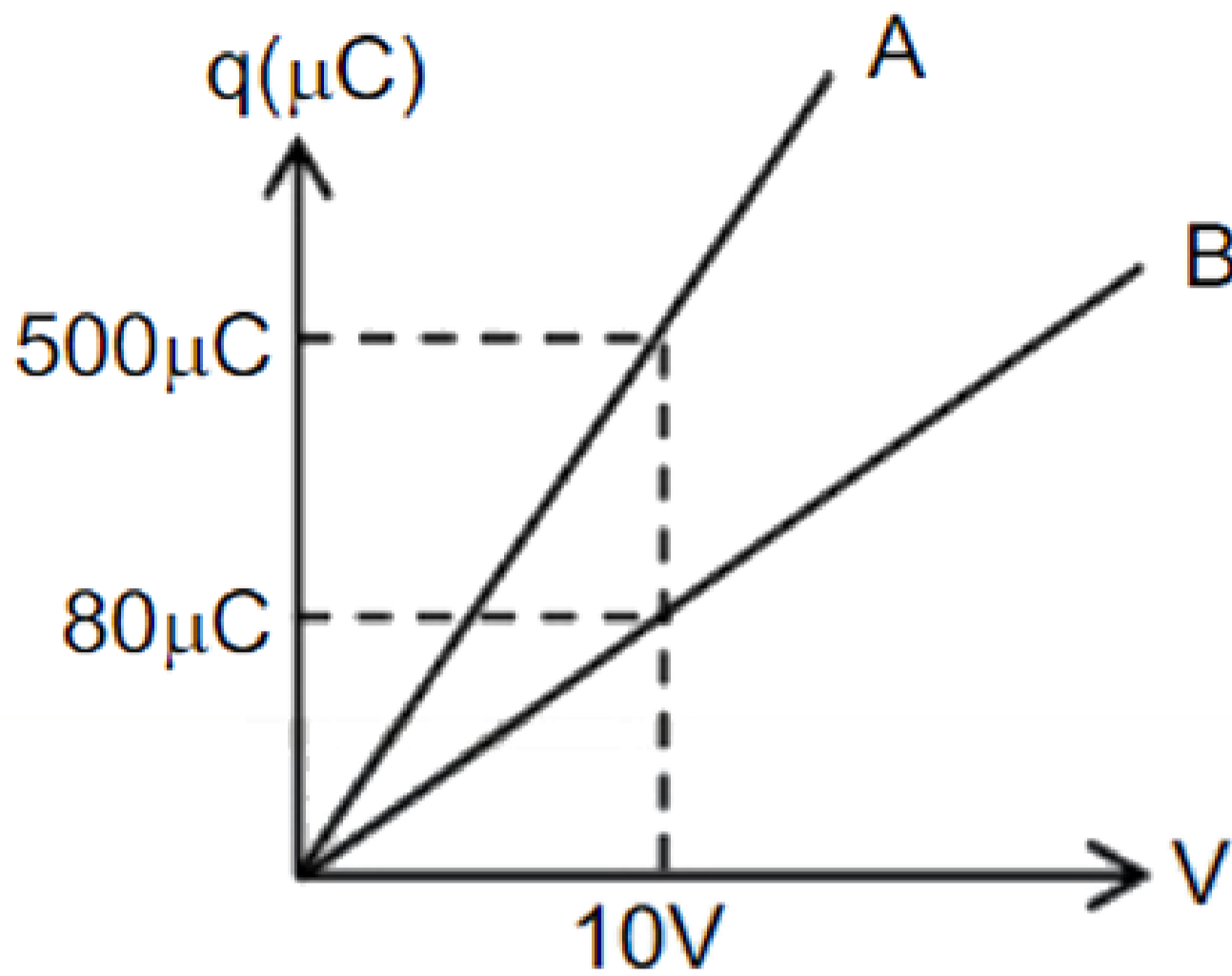
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MEMORY BASED - PHYSICS**

Plot $A \& B$ represent variation of charge with potential difference across the combination (series and parallel) of

two capacitors. Then Find the values of capacitance of capacitors.



- (A) $20\mu\text{F}$, $30\mu\text{F}$
- (B) $10\mu\text{F}$, $40\mu\text{F}$
- (C) $10\mu\text{F}$, $15\mu\text{F}$
- (D) $25\mu\text{F}$, $25\mu\text{F}$

CORRECT OPTION: B

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MEMORY BASED - PHYSICS**

Power gain for $N - P - N$ transistor is 10° , input resistance 100Ω and output resistance 10000Ω . Find out current gain.

- (A) 100
- (B) 150
- (C) 200
- (D) 50

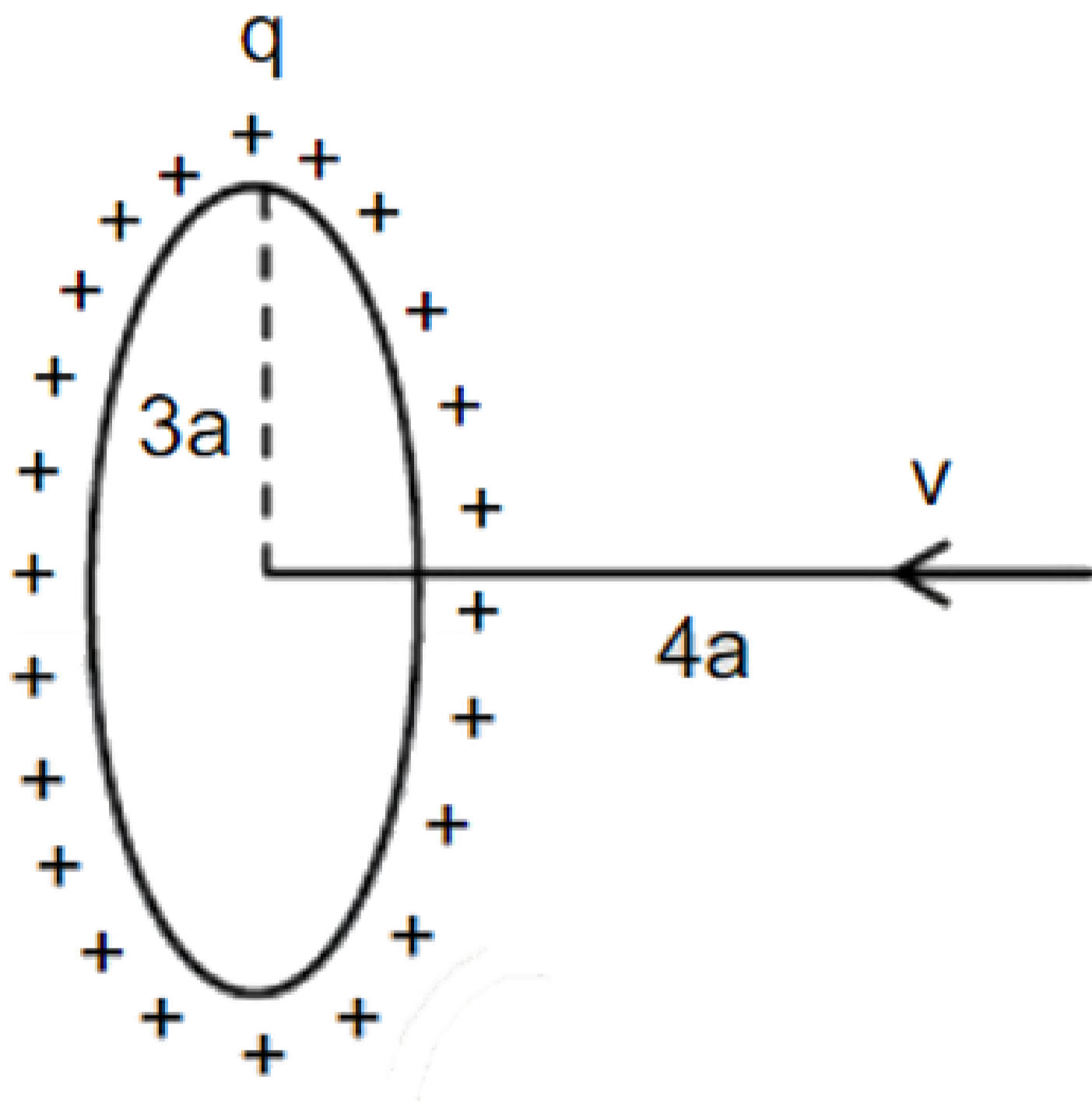
CORRECT OPTION: A

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**JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 1 -
MEMORY BASED - PHYSICS**

A Circular ring of radius $3a$ is uniformly charged with charge q is kept in $x - y$ plane with center at origin. A particle of charge q and mass m is projected from $x = 4$ towards origin. Find the minimum speed of projection such that it reaches origin.



(A) $\sqrt{\frac{q^2}{15\pi\epsilon_0 m a}}$

$$(B) \sqrt{\frac{q^2}{30\pi\epsilon_0 ma}}$$

$$(C) \sqrt{\frac{q^2}{10\pi\epsilon_0 (ma)}}$$

$$(D) \sqrt{\frac{q^2}{20\pi\epsilon_0 (ma)}}$$

CORRECT OPTION: A

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14 - 9486459

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MEMORY BASED - PHYSICS**

An ideal gas undergoes an isobaric process. If its heat capacity is C , at constant volume and number of mole n , then the ratio of work done by gas to heat given to gas when temperature of gas changes by ΔT is :

$$(A) \left(\frac{nR}{C_v + R} \right)$$

- (B) $\left(\frac{R}{C_v + R} \right)$
- (C) $\left(\frac{nR}{C_v - R} \right)$
- (D) $\left(\frac{R}{C_v - R} \right)$

CORRECT OPTION: A

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MEMORY BASED - PHYSICS**

Surface mass density of disc of mass m and radius R is $\alpha - Kr^2$. Then its moment of inertia *w.r.t.* axis of rotation passing through center and perpendicular to the plane of disc is :

- (A) $I = \frac{3}{2}mR^2$
- (B) $I = \frac{4}{3}mR^2$

(C) $1 - \frac{2}{5}nR^2$

(D) $1 - \frac{2}{3}nR^2$

CORRECT OPTION: D

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A modulating wave of frequency $100MHz$ and amplitude $100V$ is superimposed on a carrier wave of frequency $300GHz$ and amplitude $400V$. The value of modulating index and difference between the maximum frequency and

minimum frequency of modulated wave are respectively :

(A) $0.25, 1 \times 10^8 \text{ Hz}$

(B) $4.2 \times 10^8 \text{ Hz}$

(C) $4.1 \times 10^8 \text{ Hz}$

(D) $0.25 \times 10^8 \text{ Hz}$

CORRECT OPTION: D

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**JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 1 -
MEMORY BASED - PHYSICS**

The maximum kinetic energy of electron if wavelength of incident electromagnetic wave is 260 nm and cut-off wavelength is 380 nm given $hc = 1237 \text{ nm} \cdot \text{eV}$ is

(A) 1.5 eV

(B) $6.4eV$

(C) $10eV$

(D) `None of these

CORRECT OPTION: A

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18 - 9486463

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MEMORY BASED - PHYSICS**

if $\vec{E} = E_0 \cos(kz)\cos(\omega t)\hat{i}$ then \vec{B} for electromagnetic wave is

(A) $B = \frac{E_0}{C} \hat{k}$

(B) $B = \frac{E_0}{C} \sin(kz)\sin(\omega t)\hat{j}$

(C) $B = \frac{E_0}{C} \sin(kz)\cos(\omega t)\hat{j}$

(D) $B = \frac{E_0}{C} \cos(kz)\sin(\omega t)\hat{j}$

CORRECT OPTION: B

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A particle is projected vertically upwards with speed v_0 . The drag force acting on it given by $f_{\text{drag}} = m\lambda v^2$. The time when it is at maximum height is :

(A) $\frac{1}{\sqrt{g\lambda}} \tan^{-1} \left(\frac{\sqrt{\lambda}}{\sqrt{g}} v_0 \right)$

(B) $\sqrt{g\lambda} \tan^{-1} \left(\frac{\sqrt{\lambda}}{\sqrt{g}} v_0 \right)$

(C) $\frac{\tan^{-1} \left(\frac{\sqrt{g}}{\sqrt{\lambda}} v_0 \right)}{\sqrt{g\lambda}}$

(D) $\frac{1}{\sqrt{g\lambda}} \tan^{-1} \left(\frac{\sqrt{\lambda}}{\sqrt{g}} \frac{1}{v_0} \right)$

CORRECT OPTION: A

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MEMORY BASED - PHYSICS**

In a step-down transformer the turn ratio is $1:2$ and output power is $2.2kW$. If output current is $10A$ then the values of input voltage and input current.

20 - 9486465

(A) $100V, 20A$

(B) $110V, 10A$

(C) $440V, 5A$

(D) $440V, 20A$

CORRECT OPTION: C

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MEMORY BASED - PHYSICS**

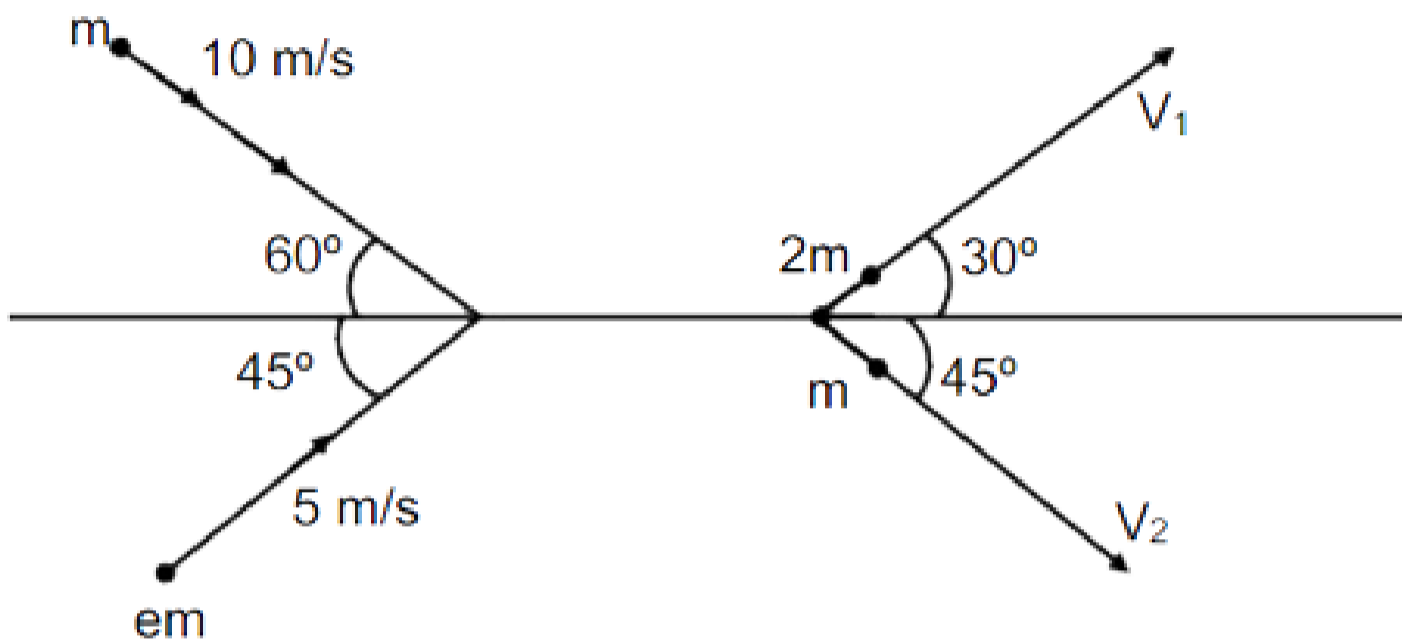
The depression of mercury in a capillary tube of radius R_1 is observed to be equal to the rise of water in another capillary tube of radius R_2 . If the ratio of surface tension of mercury and water is 7.5, ratio of their density $\frac{\rho_{Hg}}{\rho_{water}} = 13.6$ and their angle of contact are $\theta_{Hg} = 135^\circ$ and $\theta_{water} = 0^\circ$ in the respective tubes then R_1 / R_2 is :

- (A) 0.2
- (B) 0.4
- (C) 0.7
- (D) 0.8

CORRECT OPTION: B

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Two particles of masses m and $2m$ are colliding elastically as given in figure. If V_1 and V_2 speed of particle just after collision then

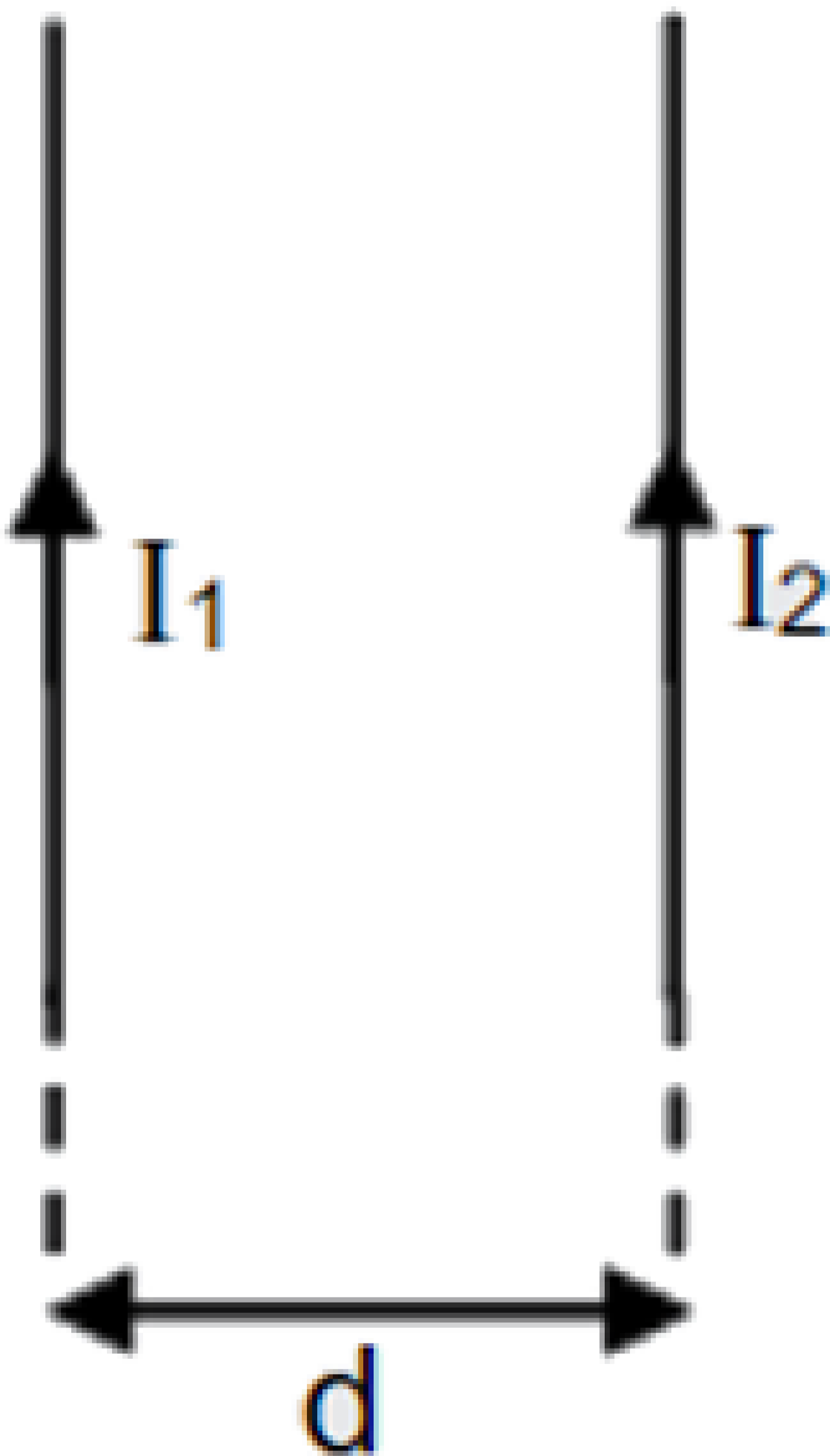


- (A) $V_1 = 11.16m / s, V_2 = 6.31m / s$
 (B) $V_1 = 10.16m / s, V_2 = 5.31m / s$
 (C) $v_1 = 9.16M / S, v_2 = 6.31M / S$
 (D) $v_1 = 6.31M / S, v_2 = 11.16M / S$

CORRECT OPTION: D

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Two parallel infinite wires separated by distance d carry currents as shown in figure,



The distance from a third infinite wire be kept parallel to wire carrying current I_1 , the wire such that it stays in equilibrium

is

- (A) $\frac{I_2}{I_2 + I_1} d$ or $\frac{I_1}{I_1 + I_2} d$
- (B) $\frac{I_2}{I_2 - I_1} d$ or $\frac{I_1}{I_1 - I_2} d$ or $\frac{I_1}{I_1 - I_2} d$
- (C) $\frac{I_2}{I_1 - I_2} d$ or $\frac{I_1}{I_1 - I_2} d$
- (D) $\frac{2I_2}{I_2 - I_1} d, \frac{I_1}{I_1 - I_2} d$

CORRECT OPTION: B

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find the equation of tangent a

Find the equation of tangent to the curve 'x=a(th...

Find the equation of tangent to the curve 'x=a(th...

Find the equation of tangent to the curve 'y=sin^-1(1...

If '3x+y-4' is a tangent to a circle whose center is ...

Find the equation of tangent to 'y=int_(x^2)^(x^3){...



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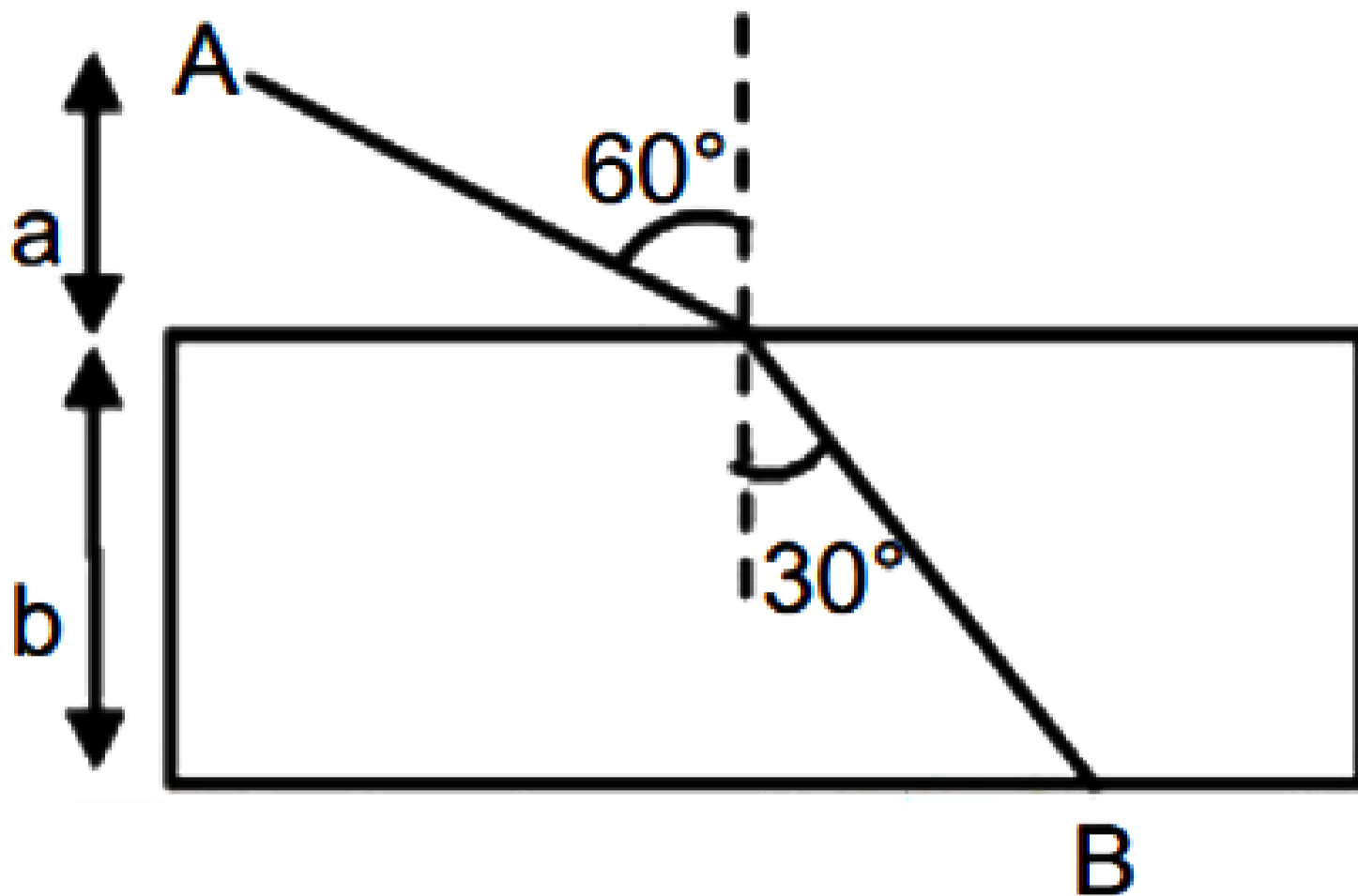
The coordinates of a particle of mass ' m ' as function of time are given by $x = x_0 + a_1 \cos(\omega t)$ and $y = y_0 + a_2 \sin(\omega_2 t)$. The torque on particle about origin at time $t = 0$ is :

- (A) $(ma_1\omega_1^2x_0)k^{\wedge}$
- (B) $(ma_1\omega_1^2x_0^2)k$
- (C) $(ma_1\omega_1^2y_0)k$
- (D) $(ma_1\omega_1^2x_0y_0)k$

CORRECT OPTION: C

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For path $A \rightarrow B$ optical path is



(A) $2(a + b)$

(B) $2(a - b)$

(C) $a + b$

(D) $a - b$

CORRECT OPTION: A

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He is kept in a rigid container of volume 67.2 ltr at STP .

The heat supplied to the gas to increase its temperature by

$20^\circ C$ is :

(A) $780J$

(B) $748J$

(C) $718J$

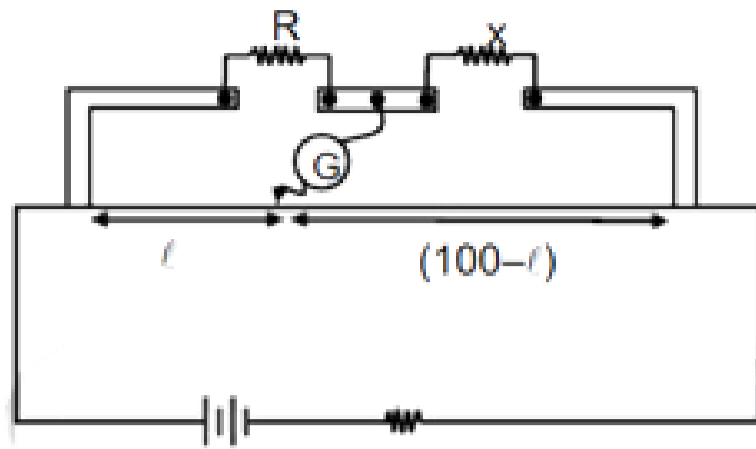
(D) $680J$

CORRECT OPTION: B

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MEMORY BASED - PHYSICS**



S.N.	R	ℓ
1.	1000Ω	60 cm
2.	100Ω	13 cm
3.	10Ω	1.5 cm
4.	1Ω	1 cm

Which of the above is inconsistent for the given meter bridge

- (A) 1
- (B) 2
- (C) 3
- (D) 4

CORRECT OPTION: D

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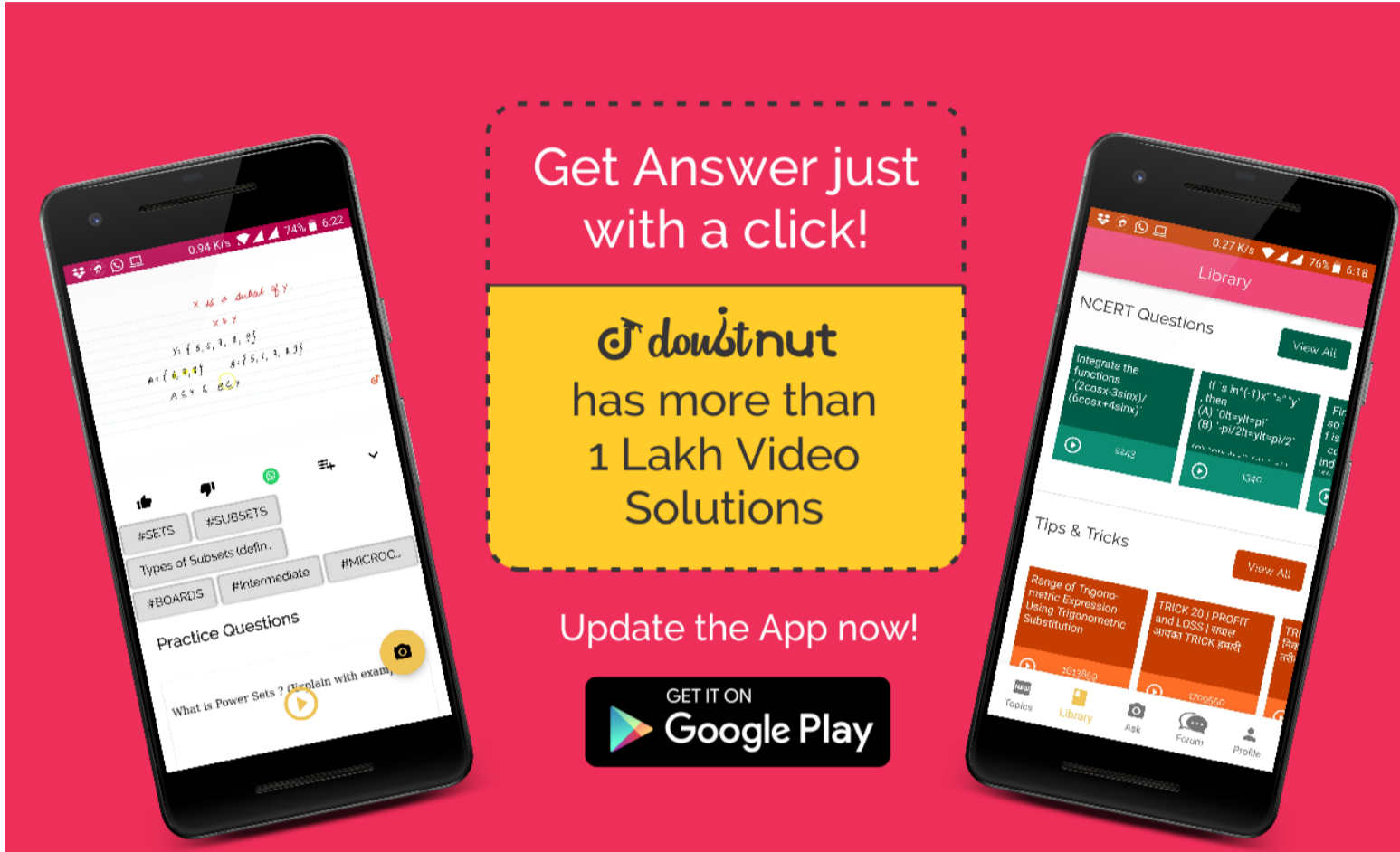
Some devices and electromagnetic wave are given in column -1 and column-2, match the device with electromagnetic wave work

<i>Column – 1</i>	<i>Column – 2</i>
(A) Mobile	(P) Microwave
(B) Sonar	(Q) IR
(C) Radar	(R) Radiowave
(D) Optical Fiber	(S) Ultrasound


- (A) $(A \rightarrow S); (B \rightarrow Q); (C \rightarrow P); (D \rightarrow R)$
- (B) $(A \rightarrow Q); (B \rightarrow S); (C \rightarrow P); (D \rightarrow R)$
- (C) $(A \rightarrow Q); (B \rightarrow S); (C \rightarrow R); (D \rightarrow P)$
- (D) $(A \rightarrow S); (B \rightarrow Q); (C \rightarrow R); (D \rightarrow P)$

CORRECT OPTION: B


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